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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
GEISEL, KARA E	
ART UNIT	**PAPER NUMBER**
2877	

DATE MAILED: 07/30/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/006,533	POLYNKIN ET AL.	
	Examiner	Art Unit	
	Kara E Geisel	2877	

-- The MAILING DATE of this communication appears on the cover sheet with th correspondenc address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 May 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-51* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *23-46* is/are allowed.

6)☒ Claim(s) *1-6,10-12 and 47-51* is/are rejected.

7)☒ Claim(s) *7-9, and 13-22* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-4, 12, and 47-51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fjarlie (USPN 4,193,691), newly cited, in view of Fateley (UPSN 6,128,078), previously cited.

In regards to claims 1 and 47, Fjarlie discloses an optical apparatus comprising an input port (column 1, lines 48-54) providing a multi-wavelength optical signal (columns 1-2, lines 65-68 and 1-7, respectively), a wavelength disperser (fig. 1, 10) which separates the signal into multiple spectral channels having a predetermined relative arrangement (column 1, lines 58-60), and an array of beam-modulating elements (fig. 1, 12) positioned such that each element receives one of the spectral channels (column 2, lines 1-15), the elements being individually closeable such that optical power levels of the spectral channels coupled into said output port carry distinct dither modulation signals (columns 4-6, lines

1-24, 7-25, and 26-36, respectively). The output port is obviously the image plane of the detector. Fjarlie does not disclose that the beam-modulating elements are micro-mirrors.

Fateley teaches that liquid crystal devices, such as the one used in Fjarlie (column 2, lines 62-68), can be interchanged with other beam-modulating elements, such as micro-mirror array (Fateley column 3, lines 58-64). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the liquid crystal modulator of Fjarlie's device with a single row array of micro-mirrors as an alternative beam-modulator.

In regards to claim 2, an optical apparatus is disclosed above. Furthermore, the apparatus also comprises an optical detector (fig. 1, 17), optically coupled to the output port, wherein said optical detector converts the optical power levels into an electrical signal (columns 5-6, lines 61-68 and 1-20, respectively).

In regards to claims 3 and 48-49, an optical apparatus with a detector is disclosed above. Furthermore, the apparatus also comprises a synchronous detection unit, in communication with the optical detector, wherein the detection unit detects from the electrical signal the dither modulation signal in the optical power levels (columns 5-6, lines 61-68 and 1-36, respectively).

In regards to claims 4 and 50, an optical apparatus with a detector and a synchronous detection unit is disclosed above. Fjarlie discloses that the signals are stored for later processing, but does not disclose how they are processed (column 6, lines 49-57). Fateley's optical apparatus is used to analyze a multi-wavelength signal that carry distinct dither modulation signals such as those found in Fjarlie's apparatus. Fateley's apparatus also comprises a signal processor (fig. 1, 22), containing a predetermined calibration table (column 4, lines 15-20), the signal processor deriving an optical power spectrum of said multi-wavelength optical signal from said dither modulation signals (column 4, lines 32-52). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use Fateley's signal processor in Fjarlie's device to analyze the spectrum of the dither modulation signals.

In regards to claim 12, an optical apparatus is disclosed above. Furthermore, the wavelength disperser can be a dispersing prism (column 1, lines 58-60).

In regards to claim 51, a method of spectral monitoring and modulating is disclosed above. Furthermore, the micro-mirrors of the combined system are individually pivoted about respective nominal position (Fateley, columns 3-4, lines 65-67 and 1-6, respectively) by way of a set of mirror control signals (Fateley, column 4, lines 3-5), thereby producing said dither modulation signals in the optical power levels.

Claims 5, 6, and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fjarlie (USPN 4,193,691), newly cited, in view of Fateley (UPSN 6,128,078), previously cited, as applied to claims 1-4, 12, and 47-51 above, and further in view of Sweatt et al. (USPN 6,504,943), previously cited.

In regards to claim 5, an optical apparatus is disclosed above. The combined system does not disclose that the detector is a photodiode, however, it is well known in the art to use photodiodes to measure optical power levels. For example, Sweatt discloses a spectral imaging device comprising an input port, a wavelength disperser, a micro-mirror array, and two photodiodes (fig. 4a, 408 and 409) to detect the optical power levels of spectral channels from a light source after it has been dispersed and modulated. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use photodiodes as the detector in the combined optical apparatus.

In regards to claim 6, an optical apparatus is disclosed above. The combined apparatus discloses that the micro-mirrors are pivoted about respective nominal positions (Fateley, column 3-4, lines 65-67 and 1-6, respectively) by way of a set of mirror control signals (Fateley, column 4, lines 3-5), thereby producing said dither modulation signals in the optical power levels. The combined apparatus does not disclose that the output port comprises a spatial filter.

Sweatt discloses an optical apparatus comprising a multi-wavelength light source, an input port (fig. 4a, 14), a wavelength disperser (fig. 4a, 18), an array of micro-mirrors (fig. 4a, 402), and an output

port, which comprises a spatial filter. The spatial filter is used so that only the modulated light from the micro-mirrors can reach the output port (column 9, lines 39-44). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to add Sweatt's spatial filter to the combined optical apparatus by the exit port so that only the light modulated by the micro-mirrors could enter the exit port.

In regards to claim 10, an optical apparatus with a spatial filter is disclosed above. Furthermore, the spatial filter of the combined system is an aperture (Sweatt column 9, lines 39-41).

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fjarlie (USPN 4,193,691), newly cited, in view of Fateley (UPSN 6,128,078), previously cited, as applied to claims 1-4, 12, and 47-51 above, and further in view of Hornbeck (USPN 5,061,049), previously cited.

In regards to claim 11, an optical apparatus is disclosed above. Furthermore, Fateley discloses a preferred embodiment of the micro-mirror array that can be used in the apparatus is disclosed by Hornbeck (column 3, lines 54-60). Hornbeck discloses that the micro-mirrors comprise silicon micromachined mirrors (Hornbeck column 9, lines 15-36).

Response to Arguments

Applicant's arguments with respect to claims 1-6, 10-12, and 47-51 have been considered but are moot in view of the new ground(s) of rejection.

Allowable Subject Matter

Claims 23-46 are allowed.

Claims 7-9, and 13-22 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

As to claim 7, the prior art of record, taken alone or in combination, fails to disclose or render obvious an optical apparatus wherein optical power levels of spectral channels coupled into a spatial filter are at respective maximum values when micro-mirrors are at nominal positions, in combination with the rest of the limitations of claim 7.

As to claim 8, the prior art of record, taken alone or in combination, fails to disclose or render obvious an optical apparatus wherein a set of mirror control signals that pivot micro-mirrors include dither components, which are mutually orthogonal functions of time, in combination with the rest of the limitations of claim 8.

As to claim 9, the prior art of record, taken alone or in combination, fails to disclose or render obvious a optical apparatus wherein a set of mirror control signals that pivot the mirrors include dither components, classified in a plurality of distinct dither groups, wherein each dither group contains dither components that are mutually orthogonal functions of time, and wherein the optical apparatus further comprises one or more auxiliary spatial filters, such that spectral channels coupled into each filter carry distinct dither modulation signals, in combination with the rest of the limitations of claim 9.

As to claim 13, the prior art of record, taken alone or in combination, fails to disclose or render obvious an optical apparatus further comprising a beam-focuser for focusing spectral channels into corresponding focused spots that impinge onto micro-mirrors, in combination with the rest of the limitations of claim 13.

As to claim 14, the prior art of record, taken alone or in combination, fails to disclose or render obvious an optical apparatus further comprising a reference signal, emerging from an input port along with a multi-wavelength optical signal, wherein a wavelength disperser directs a reference spectral component of the reference signal to a predetermined location on a reference position sensing element, in combination with the rest of the limitations of claim 14.

As to claim 21, the prior art of record, taken alone or in combination, fails to disclose or render obvious an optical apparatus wherein an input port comprises a fiber collimator, in combination with the rest of the limitations of claim 21.

As to claim 23, the prior art of record, taken alone or in combination, fails to disclose or render obvious an optical apparatus comprising an array of beam-modulating elements configured to direct first and second sets of optical beams into first and second output ports, the beam-modulating elements being individually controllable such that optical power levels of the first and second sets of optical beams coupled respectively into the first and second output ports carry distinct dither modulation signals, in combination with the rest of the limitations of claim 23.

As to claim 40, the prior art of record, taken alone or in combination, fails to disclose or render obvious an optical apparatus comprising an array of spatial light modulators configured to direct first and second sets of optical beams into first and second optical detectors, respectively, the spatial light modulators being individually controllable such that optical power levels received respectively into the first and second optical detectors carry distinct dither modulation signals, in combination with the rest of the limitations of claim 40.

Additional Prior Art

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The prior art made of record is Wilde (US Pub 2002/0131687).

Wilde discloses an optical apparatus comprising an input port providing a multi-wavelength optical signal, an output port, a wavelength disperser that separates the optical signal by wavelength into multiple spectral channels having a predetermined relative arrangement, and an array of micro-mirrors positioned such that each mirror receives a unique one of the spectral channels, the mirrors being individually pivotable.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kara E Geisel whose telephone number is 703 305 7182. The examiner can normally be reached on Monday through Friday, 8am to 4pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank Font can be reached on 703 308 4881. The fax phone numbers for the organization where this application or proceeding is assigned are 703 872 9318 for regular communications and 703 872 9319 for After Final communications. For inquiries of a general nature, the Customer Service fax number is 703 872 9317.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 308 1782.

F.L. Evans
Primary Examiner
Art Unit 2877

K.G.

KEG
July 17, 2003